

# **Tucson Region Greenhouse Gas Emissions Inventory**

**Climate Change Advisory Committee  
May 21, 2009**

**Susanne Cotty, Air Quality Planner  
Pima Association of Governments**

# Scope of Project

## **Four Interconnected Inventories:**

- Eastern Pima County Community
- Tucson Community
- Pima County Government Operations
- City of Tucson Government Operations

Cooperative efforts of PAG, City of Tucson and Pima County

## Goals of Inventory

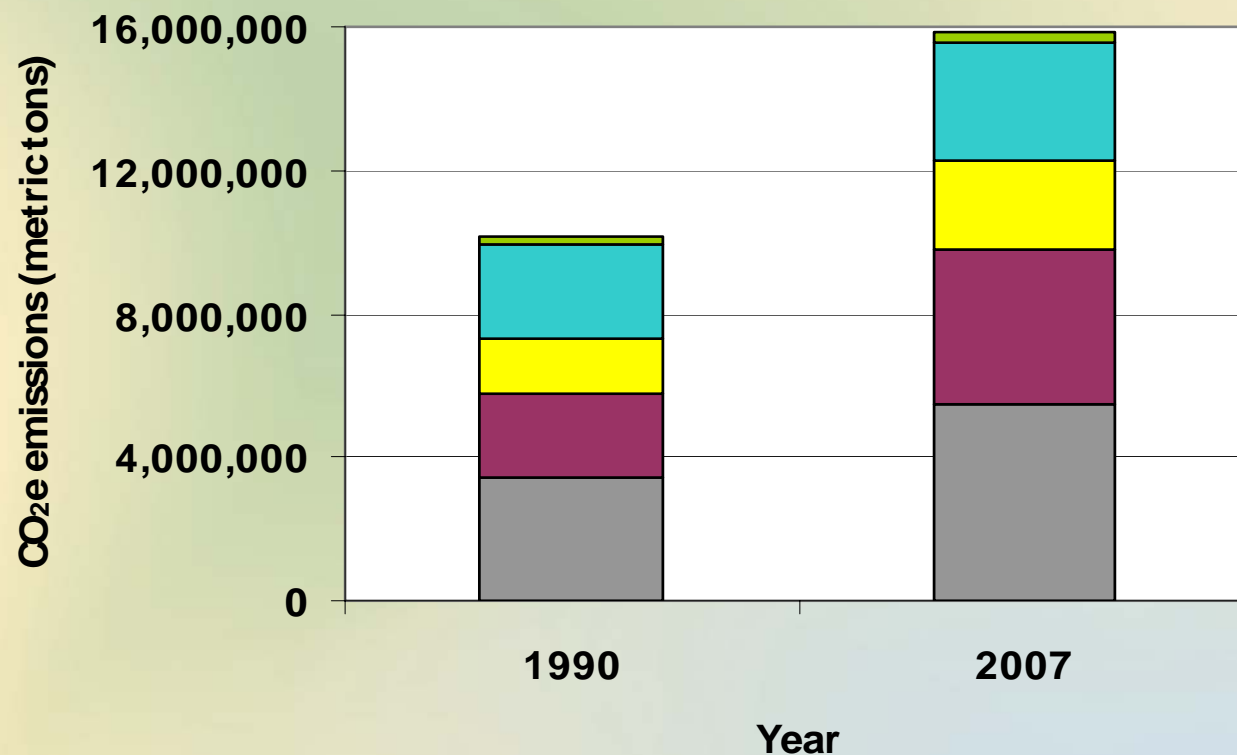
- Establish a preliminary assessment of GHG emissions and major sources
- Show emission trends from 1990 to present
- Provide data to city and county officials identifying key community and government GHG sources
- Provide a framework for assessing GHG reduction strategies

## CACP Model

- Clean Air and Climate Protection (CACP) software
- Developed by the National Association of Clean Air Agencies (NACAA) and the International Council for Environmental Initiatives (ICLEI)
- Conducts inventories, evaluates and compares reduction measures, creates action plans
- Calculates GHG emissions (expressed as CO<sub>2</sub> equivalents) produced by energy use and solid waste disposal
- Uses local data and national, regional or custom emission factors to estimate CO<sub>2</sub>e

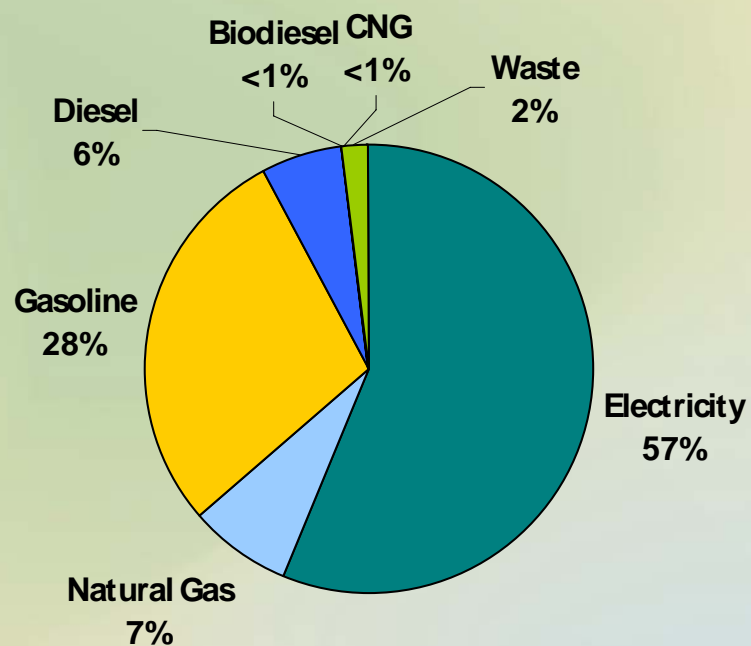
# 1990 and 2007 County Trends

**56% Increase in Emissions  
(50% Population increase)**



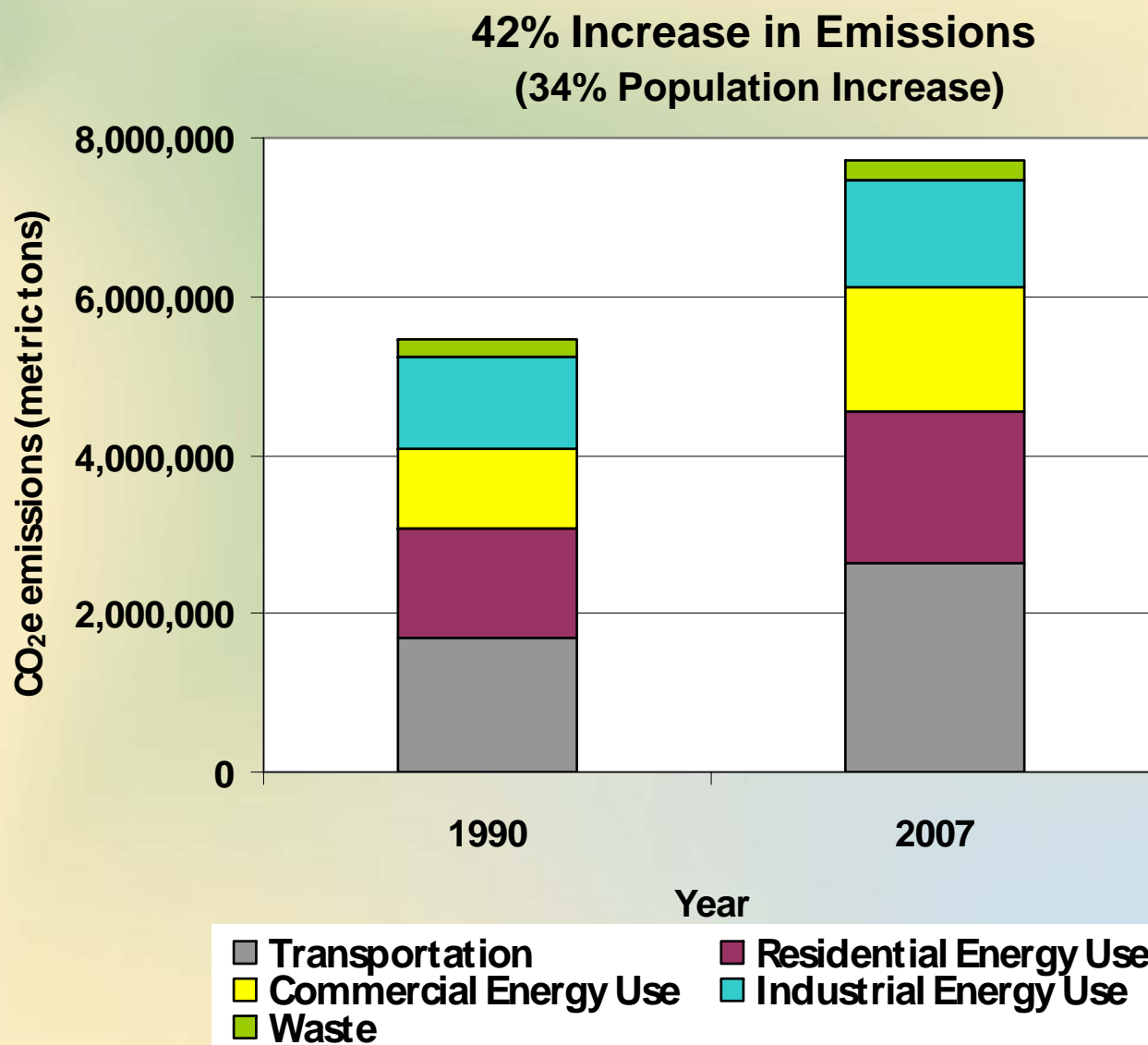
■ Transportation      ■ Residential Energy Use  
■ Commercial Energy Use      ■ Industrial Energy Use  
■ Waste

# 2007 County Emissions by Source

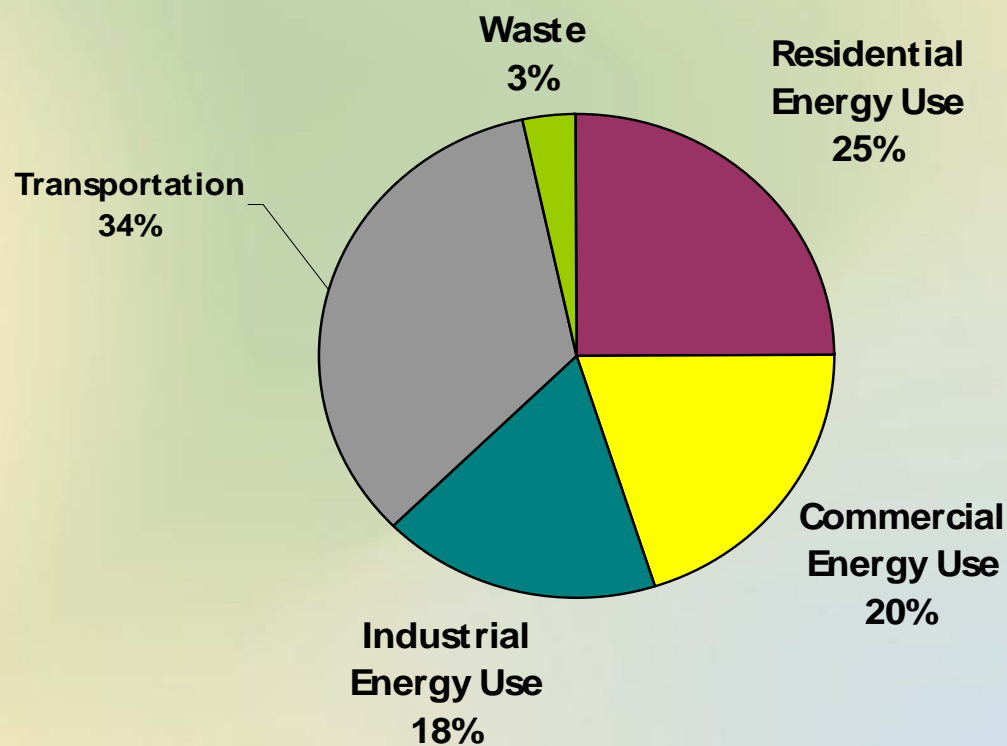


2007 County emissions total: 15,860,639 metric tons

# 1990 and 2007 City Trends

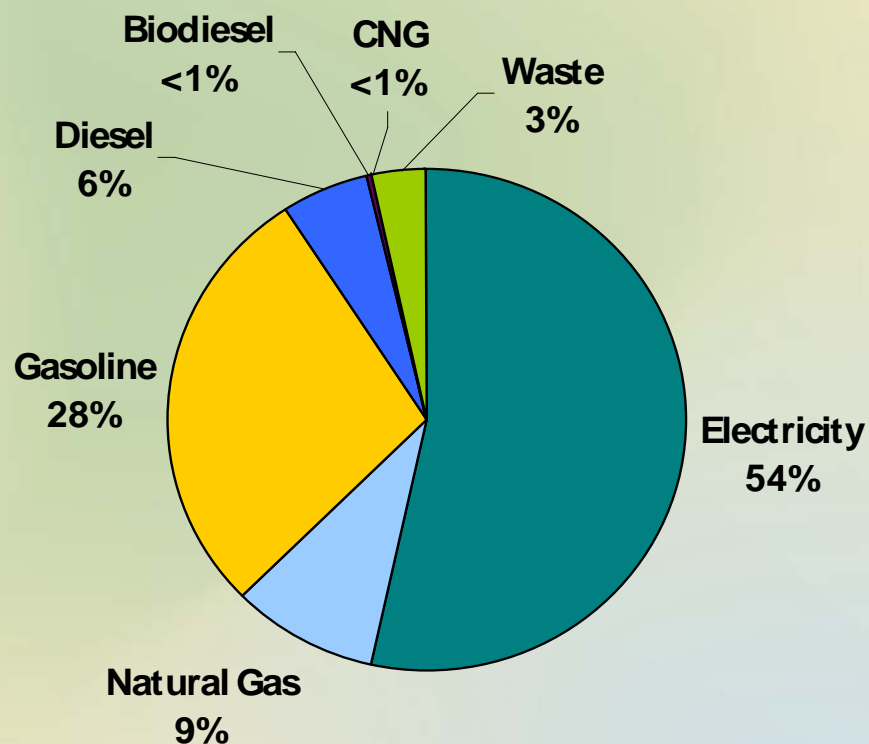


# 2007 Tucson Emissions by Sector



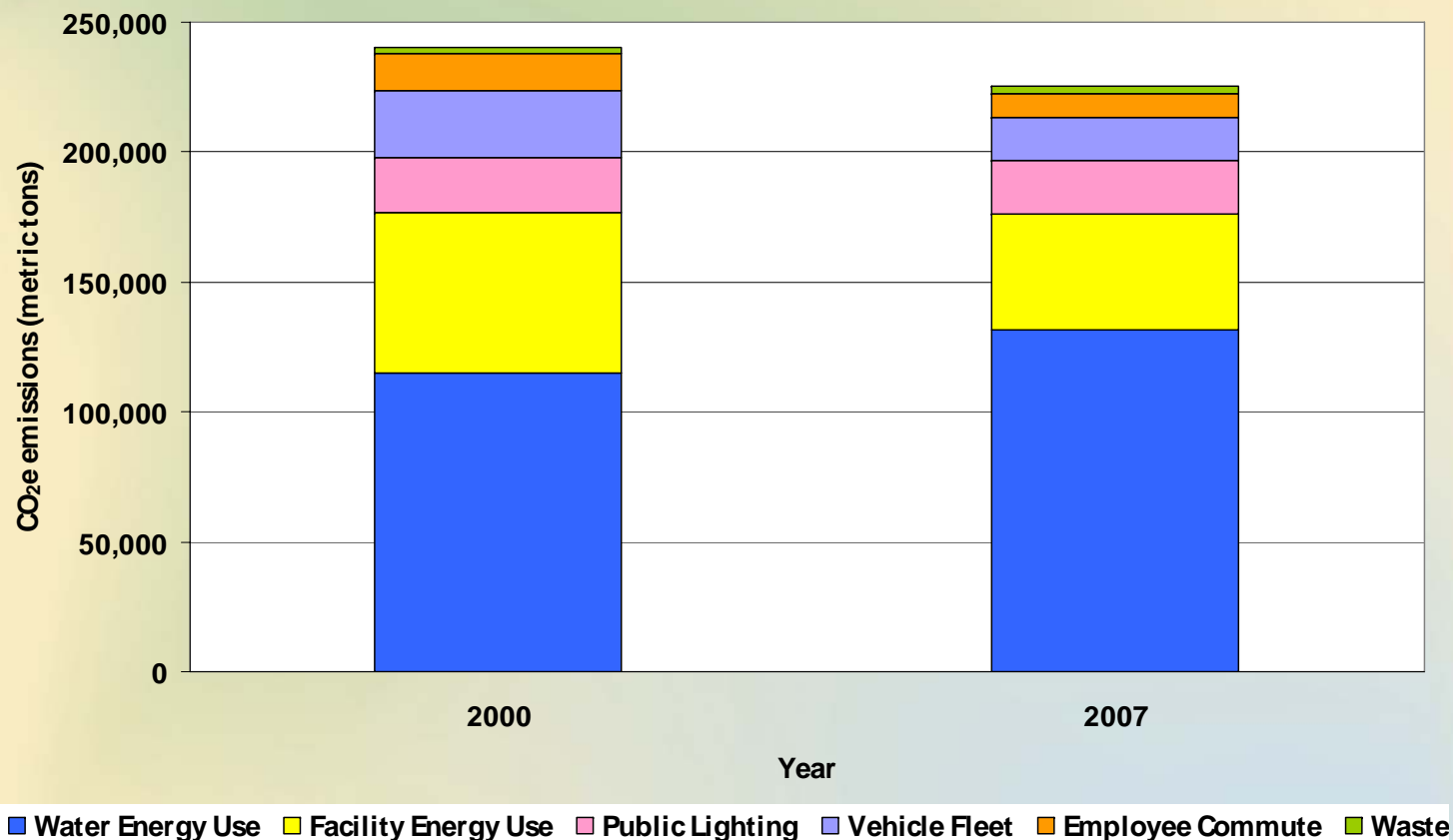
2007 City emissions total: 7,730,392 metric tons; approximately 50% of Pima County emissions

# 2007 Tucson Emissions by Energy Source



# 2000 and 2007 City Government Operations Trends

6% Decrease in Emissions



# Tucson Community and Government Inventory Findings

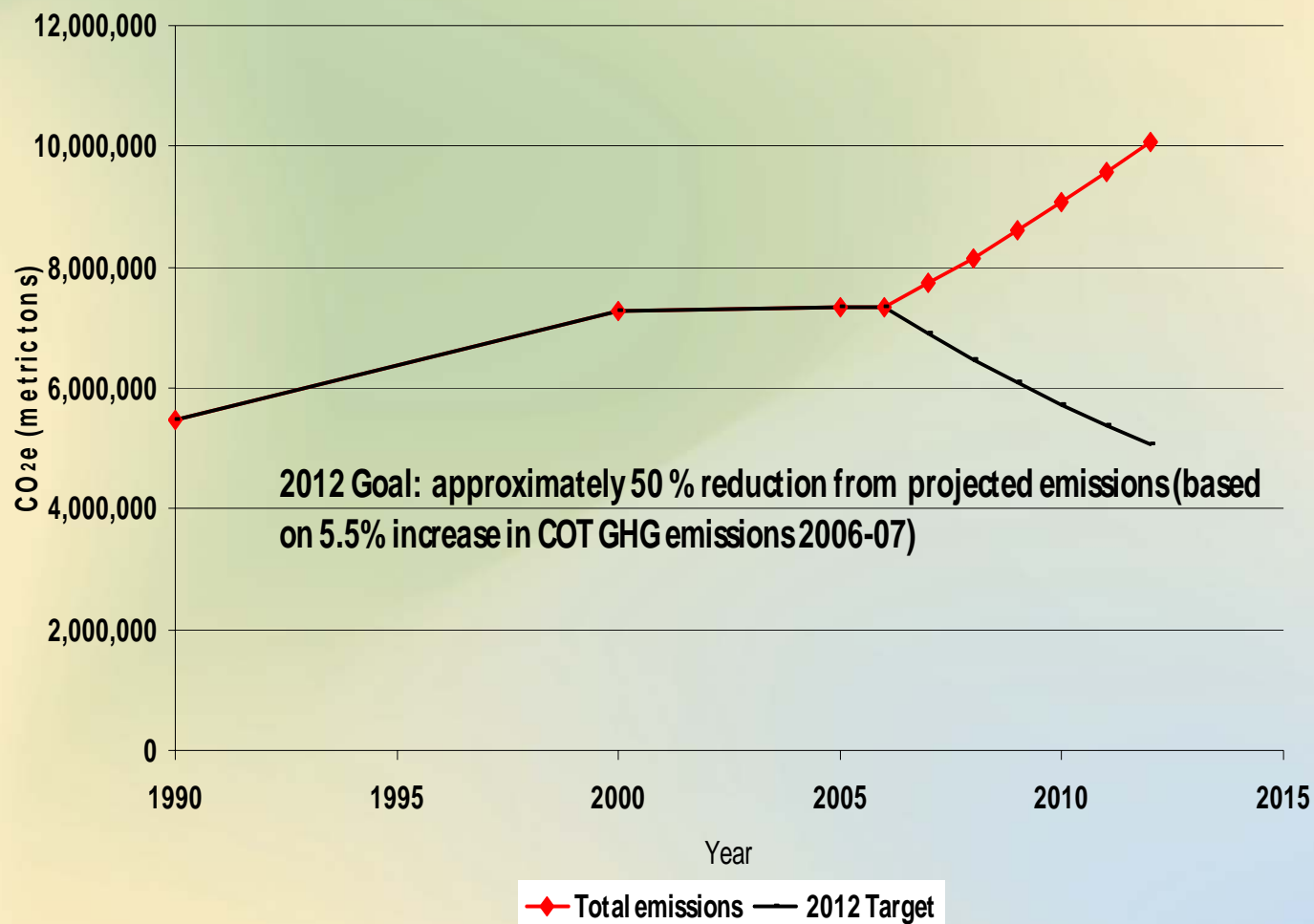
## **COMMUNITY (1990-2007)**

- Community emissions increased by 42 percent – follows population trends (34 percent)
- Energy use is approximately two-thirds of total City GHG emissions
- On-road vehicle travel produces about one-third of total emissions
- Personal and commercial vehicle use are 99 percent of transportation emissions

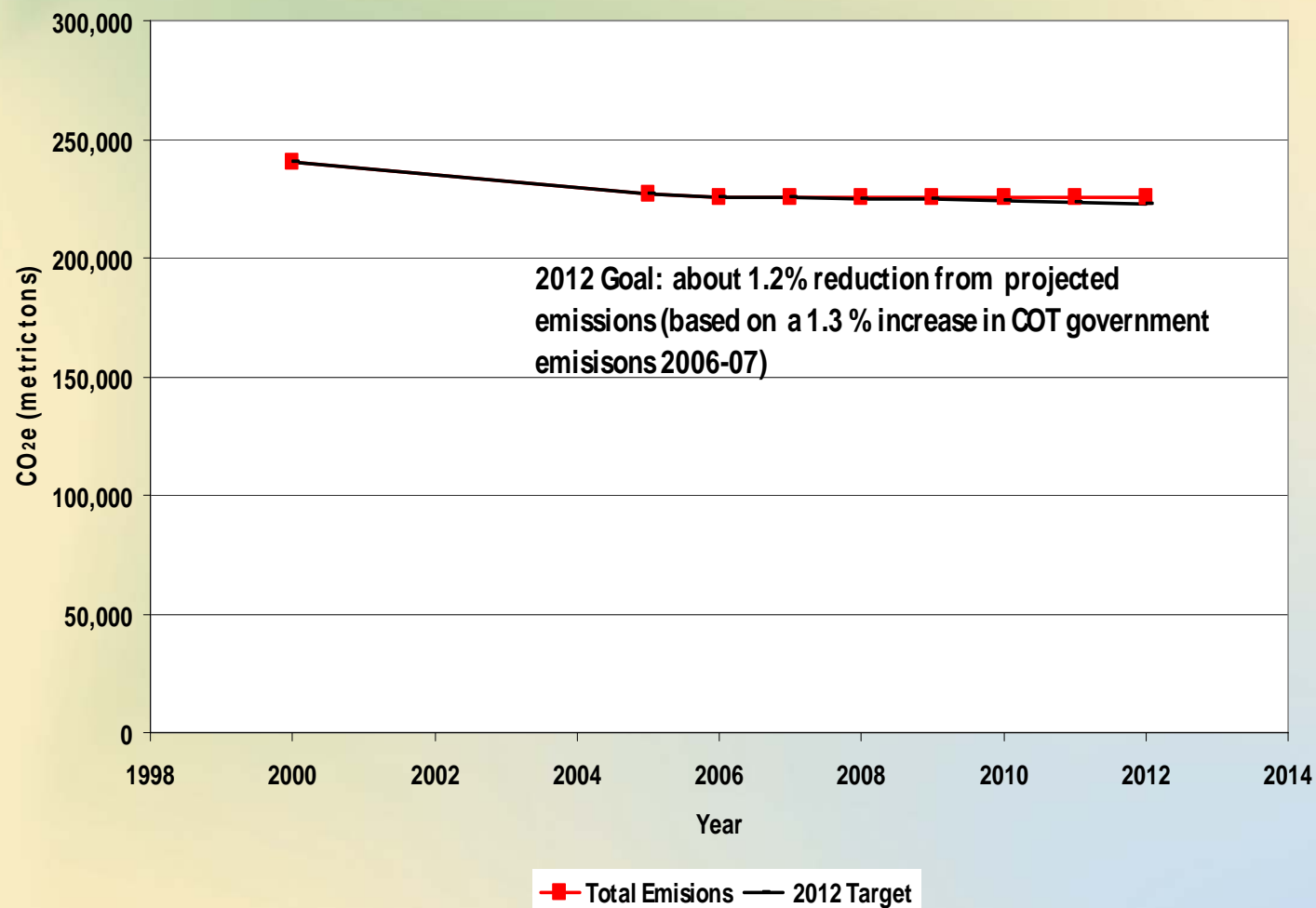
## **GOVERNMENT (2000-2007)**

- Government emissions average 3 percent of City's total
- GHG government emissions dropped by 6 percent
- Energy used for pumping and distribution of potable water averages 50 percent of government emissions
- Building energy use contributes an average of 20 percent to total government emissions

# Tucson Business-as-Usual Projected GHG Emissions and 2012 Reduction Target



# Tucson Government's Business-as-Usual Projected GHG Emissions and 2012 Target



# Evaluating Reduction Measures

- **CACP Model:**

- Inputs: Baseline year data, reduction goal, target year
- Outputs: Forecasts emissions and calculates reductions from existing/proposed measures in reference to target goal and year

- **Community GHG Reduction Proposals**

- Energy use, transportation, waste, other

- **Government GHG Reduction Proposals**

- Facility and water energy use, waste, vehicle fleet, streetlights, employee commuting, other

# Community Reduction Measures- examples

City Sector	Energy Use/Source	Cost/energy Unit	Measure	Factor	CO <sub>2</sub> e (metric tons) (2012)	Cost/Year (million dollars)
Residential Electricity (2007)	1.9 billion KWh TEP 2007	\$ 0.08/KWh	None	None	1.7 million	155.6
Residential Electricity (2007)	1.8 billion KWh	\$ 0.08/KWh	Energy use reduction	10 % (2010 only)	-168,366	-15.6
Private/Commercial Transportation (2007)	4.48 billion annual miles	\$ 0.54/mile (AAA, 2008)	None	None	2.6 million	2,400
Private/Commercial Transportation (2007)	4.43 billion annual miles	\$ 0.54/mile (AAA, 2008)	Travel reduction	1 % (2010 only)	-24,743	-24.2

# Government Reduction Measures - examples

Government Sector	Energy Use/Source	Cost/energy Unit	Measure	Factor	CO <sub>2</sub> e (metric tons) (2012)	Cost/Year (million dollars)
All Water Electricity Use (2007)	197million KWh TEP 2007 E.F.	\$ 0.07/KWh	None	None	167,484	16.0
All Water Electricity Use (2007)	197 million KWh Solar Energy	\$ 0.10/KWh	Change energy source	10% (2010 only)	-17,032	+0.6
City Fleet (2007)	15.7 million annual miles (gasoline)	\$ 0.24/mile	None	None	10,122	3.7
City Fleet (2007)	15.7 million annual miles	\$ 0.24/mile	Fuel change	25% E85 (2010 only)	-1,092	3.7

# Questions? Comments?

## Report Available at:

<http://www.pagnet.org/documents/Air/GreenHouseGas-2008-11-Inventory.pdf>

## Contact information:

Susanne Cotty, Air Quality Planner  
Pima Association of Governments  
[scotty@pagnet.org](mailto:scotty@pagnet.org)  
(520)792-1093